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# CLINICAL SIGNIFICANCE OF THE EMPYEMA OF THE URETERAL STUMP

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## INTRODUCTION

Nephrectomy is usually performed without complete removal of the lower part of the ureter; consequently, the ureteral stump is left intact. Although patients usually present no clinical symptoms, lesions such as calculus, neoplasms, inflammatory change, etc., are sometimes observed<sup>1)</sup>.

This paper reports five cases of empyema of the ureteral stump. A review is made of the Japanese literature on the subject from 1935 to 1978. The etiology of the condition is discussed.

## CASE REPORTS

Case 1. A 43-year-old woman underwent a left nephrectomy for renal tuberculosis in 1973. She was seen at the clinic in 1974 with complaint of left flank pain associated with chill and fever. Urinalysis showed moderate pyuria. Cystoscopy revealed the left ureteral orifice to be horseshoe-shaped. Cystogram (CG) showed vesico-ureteral reflux on the left. The excised ureteral stump measured 1.5 cm in diameter, 14 cm in length. It contained purulent fluid. The ureteral wall was extremely hypertrophied, but on histological examination showed no evidence of malignancy. The patient's condition improved after excision of the infected ureter.

Case 2. A 69-year-old woman underwent a left nephroureterolithotomy followed by nephrectomy for unknown lesion

in 1952. Twenty-five years after the operation, she was seen at the clinic with complaint of persistent purulent discharge from the fistulous opening in the left flank region. Urinalysis was normal. Cystoscopy revealed the ureteral orifice to be closed. Sinogram showed the patent fistula communicating with the ureteral stump and a calculus lodging at the juxtavesical ureter (Figure 1). Purulent material was found to contain *Pseudomonas*. Histology showed chronic inflammatory lesion (Figure 2). The wound did not heal satisfactorily after surgery.

Case 3. A 44-year-old woman underwent a right nephrectomy for a contracted kidney due to vesicoureteral reflux. Moderate pyuria has not yet disappeared two years and eight months later. The excretory urogram and voiding cystogram (VCG) demonstrated the reflux of contrast medium into the stump (Figure 3). The excised ureteral stump had a hypertrophic wall. Chronic inflammation was revealed on microscopic examination (Figure 4). After excision the patient's condition improved.

Case 4. A 53-year-old woman underwent a right nephrectomy for a contracted kidney due to vesicoureteral reflux. After two years and three months urinalysis showed intermittent pyuria. Reflux into the ureteral stump was visualized on the CG and VCG (Figure 5).

Case 5. A 38-year-old woman underwent a right nephrectomy for renal tuber-



Fig. 1. Case 2. Sinogram, showing the fistula communicating with the ureteral stump and a calculus lodging at the juxtavesical ureter.

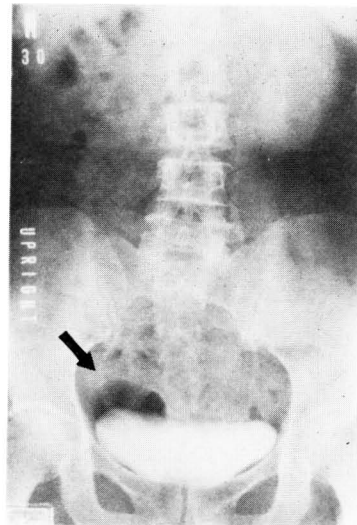


Fig. 3. Case 3. Excretory urogram, showing the reflux of the contrast medium into the ureteral stump (arrow).

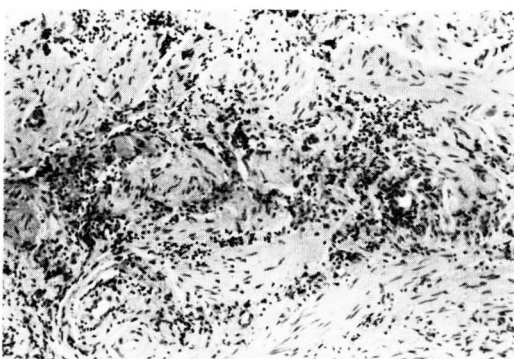
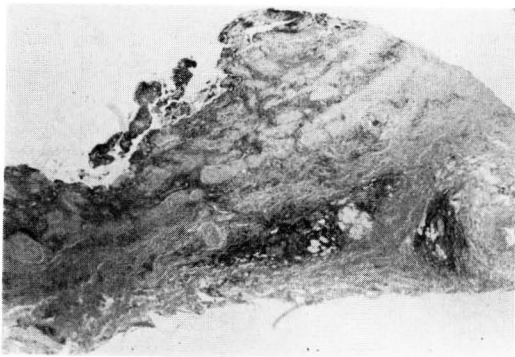


Fig. 2. Case 2. Section of the ureteral stump shows atrophic mucosa, irregularity of muscle layer and infiltration of lymphocytes.

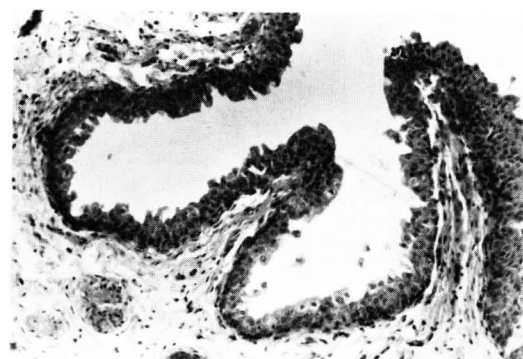
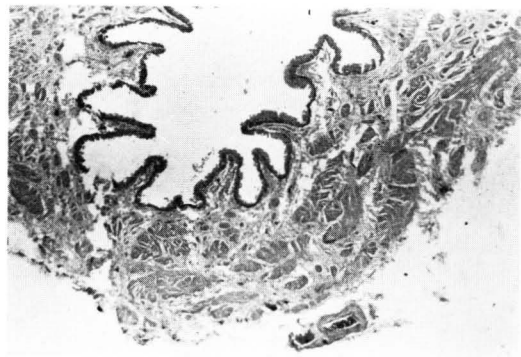


Fig. 4. Case 3. Section of the ureteral stump shows hyperplasia of mucosa and irregularity of muscle layer due to the chronic inflammation.

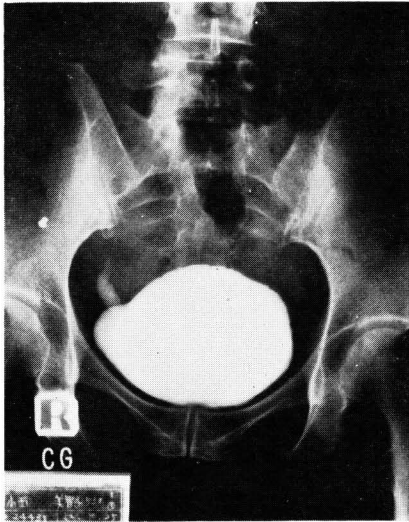


Fig. 5. Case 4. Cystogram shows the reflux into ureteral stump.

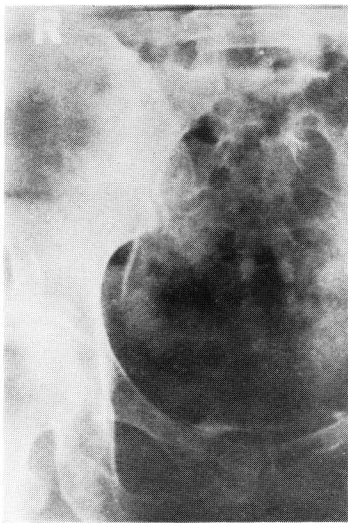


Fig. 6. Case 5. Postvoiding cystogram, showing the remains of the contrast medium at the right ureteral stump.

culosis in 1974. Mild pyuria has continued. CG and VCG showed the reflux into the ureteral stump (Figure 6).

Case 4 and 5 are being followed in the outpatient department.

#### DISCUSSION

After nephrectomy, the ureteral stump is usually retained. Latchem (1922)<sup>2)</sup> reported that a normal ureteral stump, even a hydroureter and pyoureter with

good drainage following simple nephrectomy, undergo muscular atrophy with preservation of ureteral mucosa and lumen. Malek (1971),<sup>3)</sup> however, reported no significant muscular atrophy in 100 normal asymptomatic stumps, although muscular fibrosis occurred in a symptomatic group of patients.

The incidence of lesions occurring in the ureteral stump is not known. Fowler (1910)<sup>4)</sup> reported 4 cases in a series of 900 nephrectomies. Malek (1971) encountered 42 cases in 4883 nephrectomies. Five cases have been seen at this clinic in a series of 241 nephrectomies. Therefore, a total of only 18 cases has been described during the last 42 years. It is possible, however, that this low incidence is a result of lack of recognition of the condition.

In the reported cases, the ratio of male to female was 8 to 10. The mean age was 47.0 years (range 14~69 years) (Table 1). The right side was affected as well as the left.

Table 1 shows that the chief symptoms were: pyuria (9 cases), fever attack (5 cases), tenderness (4 cases), and patent fistula (4 cases).

Table 1 also shows conditions requiring nephrectomy. The most frequent was urolithiasis with pyoureter such as pyelonephrosis, followed by renal tuberculosis as the next most common condition. Cases of contracted kidney due to vesicoureteral reflux have not yet been reported in the literature but this condition has been experienced by two patients at this institution (Cases 3 and 4).

The period from nephrectomy to diagnosis of the lesion varied from 2 months to 25 years.

Lesions associated with empyema of the ureteral stump were reported by many authors. Ureteral calculus was observed in more than half the patients. Two patients had primary neoplasms associated with the stump; one was diagnosed as transitional cell carcinoma and the other as papillary tumor.

Etiology of the empyema of the ureteral

Table 1

No	Sex	Age	Symptoms	Side	Disease for nephrectomy	Period from nephrectomy to diagnosis	Associated lesions			Reflux into ureteral stump
							calculus	tumor	fistula	
1 <sup>3)</sup>	M	60	Pyuria, Abdominal mass	Rt	Pyonephrosis	2 mo.	+		+	
2 <sup>5)</sup>	F	32	Pyuria, Tender left flank	Lt	Pyonephrosis	10 yr.	+			
3 <sup>7)</sup>	F	35	unknown	Rt	Pyonephrosis	5 mo.	+		+	
4 <sup>9)</sup>	M	35	General fatigue	Lt	Pyonephrosis	5 yr. 8 mo.				
5 <sup>9)</sup>	M	30	Pyuria, Fever, Tender right lower abdomen	Rt	Renal tuber- culosis	2 yr.				
6 <sup>10)</sup>	M	69	Pyuria	Lt	Renal tuber- culosis	3 mo.	+			
7 <sup>11)</sup>	M	62	Fever, Tender left lower abdomen	Lt	Urolithiasis	3 yr.				
8 <sup>12)</sup>	F	63	Tender lower abdomen	Rt	Hydronephr- osis	12 yr.	+	+		
9 <sup>13)</sup>	F	51	unknown	Lt	Renal tuber- culosis	2 yr.	+			
10 <sup>14)</sup>	M	64	Asymptomatic hematuria	Rt	Hydronephr- osis	2 yr. 3 mo.	+			
11 <sup>15)</sup>	M	38	Fistula formation, Pyuria, Fever	Lt	Hydronephr- osis	13 yr.				+
12 <sup>16)</sup>	F	46	Pyuria	Rt	Urolithiasis Hydronephr- osis	12 yr.		+		
13 <sup>17)</sup>	M	14	Recurrent fever attack	Lt	Pyonephrosis	1 yr. 3 mo.				+
14	F	43	Fever attack, Tender left lower abdomen	Lt	Renal tuber- culosis	10 mo.				+
15	F	69	Persistent purulent discharge	Lt	Urolithiasis	25 yr.	+		+	
16	F	44	Pyuria	Rt	Contracted kidney	2 yr. 8 mo.				+
17	F	53	Pyuria	Rt	Contracted kidney	2 yr. 3 mo.				+
18	F	38	Pyuria	Rt	Renal tuber- culosis	3 yr. 3 mo.				+

Table 2. Etiology of the empyema of the ureteral stump

- 1) Calculus in the ureteral stump
- 2) Inflammation, i.e. ureteritis, periureteritis
- 3) Vesicoureteral reflux
- 4) Hydro- and pyo-ureteronephrosis, particularly where stricture or dilatation of the ureterovesical junction is present
- 5) Ureteral stump communicated with abscess.
- 6) Congenital anomaly.

stump is summarized in Table 2. Calculus had previously been thought to be of importance, affecting 50% of patients. However, Livermore (1950)<sup>18)</sup> emphasized that calculi were dropped into the residual ureter at surgery in most cases, and that it was important to take this into consideration. We share this opinion.

Inflammatory changes such as ureteritis and periureteritis were also causative factors. These were usually observed in

urinary tuberculosis. These changes were the cause of the empyema of the ureteral stump in Cases 1 and 5.

Reflux should be kept in mind as a cause of this condition. Bruce (1964)<sup>19)</sup> reported two cases, Benetts (1955)<sup>20)</sup> one case, Malek (1971) five cases, and Kodama (1977) one case. Reflux occurred in Cases 1, 3, 4 and 5, as described above.

Bruce (1964) emphasized that if the patient complained of unexplained loin or abdominal pain, particularly when associated with persistent urinary tract infection, vesicoureteral reflux occurring in the ureteral stump should be considered and urological examination for the ureteral stump obtained. This opinion was supported by Schneiderman (1968).<sup>21)</sup>

Rieser (1950)<sup>22)</sup> reported that an emptying time at retrograde pyelography was useful. If it were longer than one or two hours or vesicoureteral reflux was observed on urological examination, he recommended that the urologist perform a nephroureterectomy instead of nephrectomy. Schneiderman (1968) agree with this recommendation.

### CONCLUSION

The urologist should examine the ureteral condition before nephrectomy if possible. If conditions are such that may ensure empyema of the ureteral stump, nephroureterectomy should be performed.

### SUMMARY

In addition to five cases at this institution, 18 instances of empyema of the ureteral stump have been reported between 1935 and 1978. The main causes for this condition were thought to be calculus and inflammatory change. However, reflux was reported in four of the five cases cited in this report, and in one case described elsewhere. Reflux therefore should be recognized as a possible cause of empyema of the ureteral stump. When urological examination reveals the vesicoureteral reflux, whether or not urinary tract infection is present, nephroureterectomy rather than nephrectomy should be performed.

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## 和文抄録

### 残存尿管蓄膿症の臨床的観察

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1935年から1978年までの間に、本邦で報告された残存尿管蓄膿症は、自験例5例を含めてわずか18例にすぎない。その主要な原因として、結石や炎症性変化の

存在があげられているが、われわれは膀胱尿管逆流現象も発症の1つと考えている。腎摘患者で膀胱尿管逆流現象が認められるとき、腎尿管全摘除術が望ましい。